DELHI SCIENCE FORUM
REPORT ON THE
SEMINAR

ON

IMPORT OF TECHNOLOGY

AND ITS

IMPACT ON DEVELOPMENT

held on

May 12th & 13th, 1979

Rani Narayan

COMMUNITY HEALTH CELL
326, V Main, I Block
Koramangala
Bangalore-560034
India

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COMMUNITY HEALTH CELL
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Koramangala
Bangalore-560034
India

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1. INTRODUCTION

The Delhi Science Forum was constituted on 20th April, 1979. It aims to provide an opportunity to scientists and technologists in particular, and other citizens in general, for informed discussions on science and technology policies and their implementation which affect national development and achievement of self-reliance.

A seminar organised on 12th and 13th May 1979 on "Import of Technology and Its Impact on Development" was the Forum's first major activity. There was enthusiastic response to the invitations from participants and positive results were achieved.

The seminar on "Import of Technology and Its Impact on Development" was a seminar with a difference. People from different walks of life, scientists, economists, engineers, politicians, students, administrators and planners met to discuss the policies and their implications with respect to import of technology. The participants were well informed on their topics and some interesting questions were thrown up,

The resolution adopted by the seminar emphasised that political independence cannot be sustained without economic independence which, in turn, is dependent on scientific and technological self-reliance. The resolution called upon the scientific community to play it role in striving for self-reliance. This document briefly presents (i) a summary of the issues raised and (ii) the general trend of the discussions. The complete proceedings will be published separately. We wish to acknowledge, with thanks, the grant made available by the Zaheer Science Foundation which made it possible for the Delhi Science Forum to organise the seminar. The organisers also wish to express their thanks to the Indian National Science Academy for making available their conference room and other facilities.

2. TEXT OF THE RESOLUTION

This gathering of scientists, technologists, planners, academicians, administrators and parliamentarians has noted with great concern the steady erosion of the values created in our struggle for national independence. It further notices that political independence cannot be sustained without economic independence, which in turn, is dependent on scientific and technological self-reliance. It notes that over the years since independence, India has built up a high degree of competence and capability in science and technology, both in terms of personnel and infrastructure.

The Seminar notes with regret, however, that these capabilities have not been utilised in the pursuit of the nationally accepted goals of self-reliance. On the contrary the country has been indiscriminately importing foreign technology, mostly from multinational corporations, much to the detriment of indigenous R & D, educational infrastructure and design and engineering capability. The seminar feels it necessary to point out that the import of technology has, far from achieving the nationally accepted goals of eradicating poverty and unemployment, only helped in developing a small market for elitist consumption and increasing disparities in incomes. This indiscriminate import has also affected adversely the skills of artisans and craftsmen. Further, it has led to the demoralisation and frustration of our scientific community. The seminar calls upon the scientific and technological community to play their role as scientists, as well as citizens, in developing technological self-reliance.

The guidelines provided, institutions established, procedures followed, and the involvement of only the administrators in decision-making have enabled the MNCs to penetrate deeply into our economy.

The code of conduct for government servants inherited from the colonial regime, facilitates the perpetuation of

dependence on foreign technology by preventing the scientists and technologists from participating in the decision-making process, from useful exchange of information among the scientists, and from the dissemination of knowledge and information for enlightened public debate.

The seminar makes the following recommendations :

1. The present instruments of policy with regard to the import of technologies which have in practice proved ineffective in achieving the national goals of self-reliance, must be thoroughly reviewed and revised suitably.

2. Institutional arrangements must be made for the professional assessment of technologies that are considered for import from the economic, social, political, energy and environmental angles.

3. The onus of proving that no indigenous technology exists in a particular field and thus a specific technology needs to be imported should be on the party desiring to import the technology.

4. The code of conduct for the working scientists and technologists in government and elsewhere must be so devised as to enable them to disseminate information, express opinions and freely participate in discussions on all matters pertaining to science and technology. This would be in consonance with the statutes of the working scientists adopted by the UNESCO to which India is a party.

5. In order to promote the utilisation of the indigenous R & D there should be premium on such utilisation.

6. There should be a statutory Parliamentary committee on Science and Technology which would have frequent communication with scientific and technological community so as to enable informed discussion in the Parliament on scientific and technological issues.

7. There should be a statutory Parliamentary committee for screening proposals for the import of technology.

3. SUMMARY OF THE PROCEEDINGS OF THE SEMINAR

Delhi Science Forum organised a national seminar on the "Impact of Technology and its Impact on Development". The seminar was held at the Indian National Science Academy, New Delhi on 12th and 13th May, 1979. It attracted a wide cross-section of participants, from all over the country, including scientists and technologists from national laboratories, industry and universities, economists, members of the planning commission, Members of Parliament, political workers. The presentation of papers, and discussions which followed, revealed a wide range of experience, points of view and a number of interesting suggestions on how to remedy the existing situation. A common theme running through the papers and ensuing discussion showed a grave concern amongst the participants with continued dependence on foreign collaboration, which was pinpointed as the cause for undermining the attainment of technological self-reliance. Without technological self reliance, economic self reliance cannot be achieved and this in turn endangers political independence.

3.1 Opening Session

The seminar discussions were initiated by a general review of the situation by Shri P. N. Haksar, former Chairman of the National Committee on Science and Technology. After pointing to some of the socio-cultural features in the country, he dealt on the relationship of science and techno logy to society. He said that science and technology were not independent factors in any society. Technology choices were not made in a vaccum but were in the ultimate analysis, politically determined.

Shri Haksar explained that when comparisons were made between Indian growth and the 'Miracle of Japan', the nature of Japanese development should be kept in mind, particularly the Japanese national patriotic feelings roused as

a reaction to the efforts of Admiral Perry, in late 19th century to open up Japan. Roused patriotic feelings of the people as a whole led to the establishment of a system of community of authority through the Meji Restoration. In India, we have still to go through such a process. In the past 30 years, each one of the planks on which the future of India was based seems to have fallen or is falling. Shri Haksar pointed out that this steady erosion of the values of the freedom movement and economic independence has not given us hope for further enlarging our political freedom.

Dr. K. L. Rao, Former Minister for Power & Irrigation said that foreign collaboration should take place only as a last resort. He gave details on how India had achieved self-sufficiency in the technology of dams and irrigation projects. He cited the example of how foreign experts had suggested a concrete dam for Nagarjunasagar. Ultimately the decision of Indian engineers was to build a masonry dam, the biggest of its kind in the world, giving rise to employment to tens of thousands of workers and the most optimal use of locally available resources. Dr Rao compared the development of the power industry in China, USSR and India. He referred to the inauguration of a 4 MW power station, in the USSR. Some felt that it was demeaning for Lenin to inaugurate such a small plant. But Lenin insisted that since the Soviet Union had indigenously developed the set, it was important to give such development maximum encouragement. Today, the USSR produces the largest sets in the World. The same policy was followed by China and today China is capable of manufacturing large sets. Dr. Rao lamented that in India, not only are we not exploiting available unit size but we are also importing technology for manufacturing 200 MW sets which we manufacture indigenously. Dr. Rao observed that our development was like 'Snakes and Ladders', we go up and then we go back to square one.

Shri K. R. Ganesh, Former Minister of Petroleum and Chemicals deplored the attack on all modern and scientific values in technology and planning by "deviationist" and "revivalists". He warned that the World Bank, IMF and the multinationals were ensuring that less developed countries did not become modern by saddling them with second rate technologies.

Shri C. Subramaniam, MP and former Minister of Finance wanted a consensus to emerge on all major issues facing the country. The existing political structure with its corrupt electoral system, was the root of all corruption in the Indian Society. Mr. Subramaniam maintained that heavy industry was essential to solve the problems of rural development. He said that India, in the last 30 years, had built up a strong infrastructure for self-reliant development, which should now be utilised to achieve economic self-reliance.

Shri Krishna Kant, MP, agreed with Shri Haksar that we have still not taken a decision on what we want. It is this lack of a clear perspective that comes in the way of self-reliant development. He hoped that this seminar could provide the decision makers, particularly the Committee on Import of Technology set up by the Janata Party to evolve a clear policy in this regard.

Shri P. Ramamurthi, M.P. said that that the values generated during the national struggle have been steadily denigrated. The respect earlier accorded to eminent scientists is no longer there. He said that instruments of policies like FERA were never meant to control foreign capital, but have nevertheless given foreign companies a golden opportunity for expansion. The cost of importing technology should not be measured in terms of the cost for individual products, but in terms of the cost to the economy as a whole. He called upon the scientists and technologists to come forward

with concrete issues which pertain to import of technology so that these issues can be taken up in Parliament and other platforms. With reference to the Atomic Energy programme, he said that even after 30 years we are still dependent on foreign fuel. It is stated by the policy makers that the cost of enrichment of Uranium is too high. He asked, what is the cost of enrichment of uranium to the cost of national independence ?

3.2. Instruments of Policy, Economic and Social Issues

After achieving political independence various policies were adopted by the developing countries to fight backwardness, lack of utilisation of materials (which were either under-exploited or were owned by former colonial powers) and educational social backwardness. Many prescriptions to overcome these problems have been offered, especially by scholars and governments of the western world and their organizations like the World Bank and I.M.F. strategies have varied from time to time ; 'linear growth' of the economy, and 'growth with employment', 'integrated rural development' etc. have all been prescribed from time to time. But none of these prescription have led to the lessening of the disparities between the developed and the developing countries. On the countrary, the gap is growing.

The lack of advanced technology in developing countries has been held to be one of the prime factors for their underdevelopment. After India's independence a simplistic view of development resulted in our country building up, on the one hand a large techological infrastructure, research laboratories, technical institutes and on the other the import of advanced technology in all sectors of the economy. The growth of technical manpower had made India the third largest repository of technical manpower in the world. But the import of technology has also grown over the last three

decades and along with it growing dependence on imported technology.

While the above was agreed to by all, two views of how this came about, were expressed. One held that the politicians and bureaucrats of our country were never serious about implementing the slogan 'Self reliance' and the consequence followed from that. The other the policies got distorted in their implementation.

The 1948 Industrial Policy Resolution which permitted foreign capital to exist side by side with Indian capital was held to be the 'original sin' (as described by Dr. J.D. Sethi, Member planning Commission). This resolution, and the subsequent 1954 Resolution has led us to the position in which we find ourselves to-day where foreign capital continues to play an important role.

3.21. **Instruments of Policy**

The question of the development of science and technology in general, and the import of technology in particular, was discussed within the framework of India's economic policy and its instruments Some of the views that emerged from the exposition and the lively discussions follow :

We have strayed away from the original objectives of socialism and distributive justice which were adopted. The Foreign Exchange Regulation Act (FERA) and the Monopoly and Restrictive Trade Practices Act (MRTP), which were designed to curb foreign capital and growth of Indian monopoly capital have been distorted by influential forces opposed to these goals. The Public Sector which was supposed to play a dominant role and occupy commanding heights in the Indian economy, has come to play a subservient role to the private sector.

FERA has been rendered ineffective in practice. The dependence on foreign capital has not weakened. Foreign

control of the Indian industry is growing. While the foreign branches have stagnated, indicating that they are really a hang-over from the colonial period, foreign subsidiaries which are operating in the rapidly growing technology-intensive spheres of the economy have grown fast. In certain strategic modern industries, like engineering, chemicals and pharmaceuticals and rubber, which constitute the real kernel of India's post-independence industrialisation drive, the share of foreign controlled sector is even higher. Not only that, the sector is growing at a much faster rate than the rest of the corporate sector. FERA which was enacted supposedly to regulate capital has infact proved a boon for the foreign corporate sector in terms of new capital reserves (due to sale of additional shares) and the protection they are receiving by being treated on par with Indian companies. Thus the growth of foreign capital is not based on substantial inflows of capital into India but through the ploughback of retained earnings and loans raised internally. Wide dispersion of the additional shares has left the control of the companies securely in foreign hands. Another consequence of the very large accumulation of new reserves of foreign companies has been that it has given them a chance to diversify. In fact, it has reached such a stage, that a foreign tobacco company can go into hotel construction and management and subsequently demand collaboration with a multinational. All these have an adverse impact on investment, which are being diverted from the priority sector. This process is forcing India to lose growth potential, employment opportunities etc.

3.22. Technology Transfer—Economic Aspects

The multi-national corporations are the principal vehicles of transferring technology to the underdeveloped countries. By virtue of their control over technology they can determine the direction and the nature of industrialisation

of the developing countries. This, in conjunction with their oligopolistic position helps to maintain the existing unequal international order. The MNC's retain the control over the technology transferred by consolidating all the inputs. Technical collaborations tend to be self perpetuating and every attempt at modernising means a fresh round of collaborations. The MNC's at the most permit the use of technology rather than its appropriation. Even the technology transferred is quite often out moded in the advanced Western countries.

The international market for technology is characterised by a few powerful firms who have formed cartels in almost every sector of the international economy. These cartels regulate the international prices and territorioal divisions in order to earn 'super-profits'. The underdeveloped countries are obviously too weak and disorganised to fight the combined might of the MNCs.

The cartel of the MNCs in the international technology market in protected by the international patents system. Nationals of the developing countries hold only 1% of the total patents.

The transfer of technology through the MNCs have resulted in the growth of restrictive business practices-export restrictions, tying of imports, restrictions on transfer of know-how etc. The effect of such restrictions is to orient production and sales of domestic firms to the multinational structure. Transfer pricing, the result of tying of import of raw materials and intermediate goods, is the biggest source of concealed earnings. At least 15% of the trade between developed and developing countries is in the form of intra-firm trade completely insulated from the market.

Foreign collaborations usually results in tying of imports and machinery at the inflated price, even when these are

locally available. This adversely affects indigenous industrial growth.

Indian experience has amply demonstrated the above. Not only have continous collaboration agreements been entered into, but justification has been sought in the name of encouraging competition through repetitive collaboration agreements. A study shows that out of 2360 agreements, the number of products were only 720. This is true for the private as well as the public sector. Initially there was hostility on the part of MNCs for collaboration with the public sector undertakings. This attitude has, in the course of time, undergone a change and public sector is now going in for package technology transfer from the MNCs. Collaboration with the socialist countries, has taken place only when MNCs have refused to supply the technology (Bhilai, Bokaro, Oil Exploration etc.)

Royalties and technical fees have shown a sharp rise from Rs. 769 lakhs in 1964-65 to Rs. 1831 lakhs in 1969-70, a rise of 250% over a five year period.

It is worth noting that in India also the main outflow of earnings is taking place not through open outflows-technical fees and royalties but through concealed outflows like transfer pricing etc. In the pharmecauticals and dyestuff industry there is clearcut evidence of transfer of pricing with markups of 145% to 347%.

3·23. **Social consequences of foreign collaboration**

As has already been shown, the import of technology through foreign collaboration has a historical background and it profoundly affects the economic and technological aspects of society. These in turn affect the society in general.

Foreign collaboration has resulted in the import of technology that is largely inappropriate to Indian social and

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47/1, (First Floor) St. Marks Road,
Bangalore - 560 001.

economic conditions. It has resulted in distorting the production and demand patterns in the developing countries. It has created a class of people not attuned to social ethos of the west rather than the realties. In the educational system which provides the trained technical manpower and managers for these industries, the gulf which separates it from the vast masses of the country is widening. Graduates and technicians are alienated from society and its production process, and are forced to seek service outside India.

R & D infrastructures already created in the country, which has a great potential for creating conditions for technological self-reliance faces the danger of decay, or at the best, becoming service institutions to an industrial mileu which is getting increasingly dependent on imported technologies. Indigenous technologies are being ignored adding to the frustration amongst the scientists and technologists. A vicious cycle is being created in which technology is being imported on the plea that indigenous technologies is not proven.

A deleterious effect of foreign collaboration is the financial and political corruption it breeds. Financial corruption takes more subtle forms than the political corruption we all witness. As a former Union Minister put it, it would be worthwhile to find out how many secretaries, ex-secretaries, deputy or under secretaries have ended up in the corridors of the World Bank and IMF and how many of them or their relatives are in the service of multinational corporations. These gentlemen were the ones who made decisions, on, and recommendations for, foreign collaboration. For instance one of the members of a committee set up by the Government of India to decide whether or not to manufacture a particular drug, was the PRO of the biggest MNC in India. In the selection committees for a professor's post in computer

sciences, it would not be uncommon to find a representative of MNCs.

3.3 Import of technology—Sectoral Trends

This section presents a summary of papers and discussions on aspects of foreign collaboration in various industrial sectors.

(i) *Small-scale sector*: In India, the small-scale sector is often viewed as being subservient to large scale sector and not as a vibrant, autonomous group of enterprises demonstrating decentralised growth and social justice, assuring the dignity of the individual. Small-scale industries are dependent on large scale industries for inputs, machinery, and markets. Experience has shown that in India large-scale units have shown scant respect for the needs of small-scale units. The introduction of imported technology in the large scale sector has resulted in changing demands that would call for change in the production pattern of the small-scale sector. The small-scale sector suffers because of its inability to command resources which alone can help it to cope with this changing environment.

The small scale sector, contrary to popular belief, is not necessarily labour intensive. It is not uncommon to find small-scale industries with an investment of Rs. 2.00 lakhs per employee which act as fronts for large companies. Nor should one be surprised to find many of them using high-cost, imported materials, for producing commodities to cater to the needs of elitist consumption.

(ii) *Atomic Energy*: While this country is rich in thorium resources, a developmental programme calling for the continued use of imported enriched uranium, has led this whole field into an impasse and dependence on foreign supplies. Bhabha's original plan for development of technologies

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for use of thorium and gradual replacement of imported enriched uranium by indigenous production by a centrifugal process and which was again put forward by Sarabhai in 1971 was scuttled on the plea that such processes are not feasible for small plants and were, in any case, too expensive. But Pakistan has recently shown that not only can this be done by small plants, but that it was economical too. The same fate awaited indigenous production of heavy water with the result that India is totally dependent on imported raw material for the nuclear programme. Any serious public discussion is not possible in India because of the obsessive secracy laws that govern the nuclear energy field despite a Rs 300 crores per year programme.

(iii) *Fertilizers and Pesticides ;* Both private and public undertakings are dominated by foreign collaborations. Not only have repetitive collaboration agreements been resorted to, but also different collaborators are engaged by the same company. An analysis of the nature terms, and extent of collaboration, provides a strong case for the argument that this type of collaboration both perpetuates our technological dependence, and is enormously expensive.

In the case of pesticides, it was pointed out that production is being undertaken without any reference to health hazards, on the plea that such hazards have not yet become serious in India. This is a fallacious argument. We know that the Iranian crude has a high sulphur content and the Madras Refineries, based on this crude, has led to a packet of pollution of the neighbouring human habitation. Efforts should be made to develop non-polluting biological pesticides, or where chemical pesticides are found to be essential, to minimise the hazards.

Two examples were cited to illustrate the pressures that foreign companies can bring to bear upon the Government to import technologies. Technologies for the two

pesticides were developed in CSIR but the Department of the Government tried to persuade the companies to import the technology saying that technologies are unproven or there were delays, and so on. Such examples can be multiplied where collusion between foreign companies and decision makers has generated a climate of lack of faith in indigenous technology, taken away from scientists/technologist challenging possibilities and increased Indian dependence on foreign technology and companies.

(iv) *Drugs and Pharmaceuticals:* Two points of view emerged. The first discussed the impact of imported technology (allopathic system) on the Indian system of medicine. The second view was that the whole system of medicine and the health practices in India, should be reviewed, so that the native system of medicine, developed over the centuries was not totally obliterated by the allopathic system.

The drugs and pharmaceutical industry in India, despite its impressive growth in the last three decades, continues to be dependent on imported technology for its growth. MNCs continue to play a dominant role in this sector. To substantiate this claim, the example of an anti-hypertensive drug was cited. In the case of the anti-hypertensive drug the bulk of this was imported and formulated in India by a MNC. This item was canalised through STC and it was found that it would be much cheaper to import it from a socialist country. Of course, the MNC promptly refused to formulate it. Ultimately formulation was taken up by a public sector undertaking. It clearly illustrates the direct and indirect pressures that the MNCs can bring to bear upon the Government, the culture that surrounds the drug industry and medical practice, and the restrictive practices in which the MNCs indulge.

(v) *Food industry:* Foreign collaboration has been entered into in items of conspicuous consumption like icecream,

chocolates etc resulting in the disruption of the traditional food consumption pattern in the country, more expensive and less nutritive foods replacing the traditional and wholesome foods.

The Dairy industry was examined in some detail. A public sector undertaking, violating its own guidelines, went in for foreign collaboration for packaging material (Tetrapack), at a time when more efficient material had replaced this packaging in the foreign country. The company would have gone out of business but for this order. All the more disturbing is the fact that such technology is available in India. Another example was the case of import of Caesein by the same public sector undertaking while the indigenous suppliers were ready to supply it in quantity. Again when technology had to be purchased for stainless steel containers, the public sector undertaking, instead of using indigenously, available technology entered into collaboration with a New Zealand firm. Incidentally, the New Zealand Company has technical collaboration with an Indian Company.

(vi) Computers : In this field a reverse technological transfer is occuring on the one hand, we continue to import computer systems, on the other we supply the Western world, specially the USA, with our trained technical manpower. Courses offered in engineering institutions are designed in India in such a way that students, after their training, necessarily look abroad for securing jobs. Also, it was maintained that MNCs in this field promote so called 'experts' in India with liberal grants of research programmes so that they could be useful to them. In most of the cases, the 'experts' knowledge is no criterion.

(vii) Explosives : Recently a lot was heard in the country about the scarcity of explosive for mining and industrial purposes. But it is ironical that while the Government

celebrated the centenary of explosives manufacture in India. even after 100 years, we have been unable to meet our demands without importing technology and raw material.

(viii) Transportation : As far as the Indian Railways are concerned, it appears that certain independent R & D has been done, with some success. But in the field of automobiles and trucks we remain dependent. When we look at Indian automobilies we find that we are struck with two models of cars with outdated structure. While India has perhaps the highest per vehicle automobile accidents involving human beings in the world, very little structural and other modification have been carried out to minimise the impact of accidents. As regards truck, while some success has been achieved in terms of efficiency of transport, human factors like comfort of the driver have been ignored.

(ix) Electrical Industry : One fourth of the industrial nations electrical products were bought by developing countries. In some sectors like hydro-genenerating equipment it was even higher. The structure of the electrical industry also shows a greater concentration through mergers and takeovers and a steady decline in the number of firms operating and the formation of cartels at the world level.

The International Electrical Association the cartel which covers the field of power equipment, was again reconstituted after the Second World War. Its main function is to maintain a regime of inflated prices as well as to regulate territorial divisions. Out of the nine agreements, five pertain to some form of price arrangements. They operate on the basis of reference prices fixed by the IEA. The variation in reference prices from country to country can be from 239% to 62.6% depending on political factors and whether subsidiaries of the member companies are functioning in that particular country.

Two glaring examples show the impact of such cartels. In Saudi Arabia negotiations had to be broken off with a consortium led by Philips, as the lowest bid by Philips was $ 6.7 bilion for a telecommunication project while independent consultants caculated $ 1.1. billion. In India, Philips, GEC, AEI (now GEC), Crompton Parkinson (now Hawker-Siddley) together established ELM (India) Pvt. Ltd. ELM would manufacture bulbs which would then be marketed separately by the 4 companies under their respective brand names. This resulted in (i) controlled output and prices; (ii) tied imports of machine, equipment and other intermediate goods; (iii) export possibilities were affected due to export restrictions. It is obvious that transfer of technology taking place under such conditions of international cartel formation by MNCs make the terms and conditions of the transfer even more onerous on the developing countries and inhibits indigenous development.

3.4. **Suggestions for self-reliance**

The discussions and the papers clearly led to the conclusion that India has vast scientific and technological resources and that a positive policy emphasising the national determination towards self reliance needs to enunciated. Towards this end, some positive suggestion emerged from the various papers ;

India should take the bold step of banning all import of technology and makes exceptions on a case to case basis only, when those desirous of importing technology have conclusively proved that the same was not available in India or could not be developed within reasonable cost and time. Another paper suggested that any application for the import of technology should have as a minimum the following analysis:

(a) Concrete techno-economic analysis of the effect of the import (including the disutilities).

(b) existence of sufficient conditions for the realisation of these techno-economic effects.

(c) programme of training or education of specialists in order to effectively assimilate the transfer of technology.

(d) programme of further development and exploitation of local resources.

And to begin with, the following bare minimum data must be made publicly available for the people to realise the social and economic efficiency of a collaboration :

(a) Annual increase of profits during the production under collaboration, compared with profits of production of outdated products and of introducing of one's own developments at a later stage.

(b) Additional annual gains of exports by production under collaboration.

(c) Real and hidden costs of the collaboration implying lumpsum, royalties, restrictive practices such as transfer pricing, transfer accounting, repatriation of profits on capatlization of know-how fees and other restrictive clauses for horizontal transfer of know-how, export franchise etc.

(d) Comparison of costs of purchasing technology as against developing it and absolute savings in expenditure on R & D.

It was suggested that technology should be purchased wherever necessary, by the State, on an out-right basis and resold to industrial units in order to eliminate multiple imports for the same product/processs. Towards this end, it was necessary to establish an organisation specialised in the assessment of technology.

It was suggested that all Government R & D agencies and public sector organisations should encourage basic

research in Universities. Organisations like BARC should give up their tendency to monopolize research in areas like Astrophysics and even in areas of nuclear engineering. There was a call for bringing the national laboratories and universities to work with industry on product development as a consequence of a deliberate policy. Immediate steps should be taken to ban 'copy cat' research and 'curiosity oriented research' and the priorities and objectives of research must be a direct cost function. Industrial units should not be allowed financial advantages unless the results of research and development are visible and in keeping with national priorities.

Emphasis was placed on the fact that sub-critical research would yield marginal results and only pave way for import of technology. Similarly, imbalanced growth would also lead to the same results as cited in the example of developing a combined cycle power generation without developing a gas turbine which would inevitably lead to the import of the gas turbine either as a product or as knowhow.

It was pointed out that the lack of standardization in layouts, sizes, materials, skills etc. opened the Pandora's box, import of any product or technology could be justified by merely manipulating the specifications. This was creating inroads for MNC's penetration as in the case of CF Brown's entry in designing 1350 tonnes/day fertilizer plants bye passing the capability of FPDIL on the rationale that the latter could design only 900 tonnes/day plants. The question of non-utilisation of indigenously developed technology was clearly brought out with statistics such as out of nearly 1,600 processes referred to NRDC only 400 were actually being used by the Industry.

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LIST OF PARTICIPANTS

Shri Dinesh Abrol
280, Sutlej Hostel,
JNU.

Ghanshyam Alam
1107, Kishan Ganj Teliwara,
Delhi-6.

V.B. Athereya
18-C Nizamuddin West,
New Delhi.

S. Arunachalam
P.I.D.
CSIR,
New Delhi.

Arun Attri
School of Environmental Sciences
JNU,
New Delhi.

R. Bandopadhyaya
NIBM
85, Napian Sea Rd.,
Bombay-400006.

P.M. Bhargava
Centre for Cellular and Molecular Biology
RRL,
Hyderabad.

O.P. Bhatia
Instt. of Engg.,
New Delhi.

Gautam Bhattacharya
35, Gwyer Hall,
Delhi University,
Delhi.

Deepak V.R. Chandri
Editor, URJA
G-82, Sujan Singh Park,
New Delhi-110003.

Shibani Dasgupta
URJA
G-82, Sujan Singh Park,
New Delhi-110003.

R.C. Dutt
3, Kautilya Marg,
New Delhi-110002.

Pankaj Dhar
Delhi.

A.T. Dudani
C/o ICAR,
New Delhi.

M.L. Dwivedi
Lokraj Fortnightly
B(LF) College Rd.,
New Delhi.

K.R. Ganesh
B-7/4, Vasant Vihar,
New Delhi.

P.M.S. Grewal
C-397, Defence Colony,
New Delhi.

Anjan Ghosh
IIT, Delhi.

M.P. Gupta
C-2, Panchsheel Enclave,
New Delhi.

N.S. Goswami
D.A.B. College,
New Delhi.

V. Govindrajulu
M.D.I.
F-45, NDSE-I,
New Delhi-110049.

P.N. Haksar
4/9, Shantiniketan,
New Delhi-110021.

Rakesh Vir Jasra
Vindhyachal Hostel,
IIT, New Delhi.

T.S. Kannan
Chairman, NSIC,
Okhla,
New Delhi-110021.

Krishna Kant
2, Telegraph Lane,
New Delhl.

P.K. Katti
DST,
New Delhi.

S.M. Kaushik
WB-4, Vindhyachal,
IIT, New Delhi.

Subhan Khan
Dept. of Sociology
COBS
Haryana Agricultural Univ.,
Hissar-125004.

V.C. Koshy
E/14 Gole Market
New Delhi-110001.

K.P. Kotiyal
IIT, Delhi.

G.P. Kotiyal
Tech. PHY. Div.
BARC,
Bombay-400085.

V.V. Krishna
CSSTD
CSIR.

K.V. Krishnamurthy
J-55, Saket New Delhi.

V. Krisnha Murthy
NCAER,
New Delhi.

Ajay Kumar
10/78, Old Rajinder Ngr.,
New Delhi.

Kuldeep Kumar
Ramesh H. Kundra
CSSTD,
CSIR,
New Delhi.

George M. Maddukathadom
Spl. Correspondent
UNI, Rafi Marg,
New Delhi.

N.K. Malhotra
1/19, S.P. Vihar
New Delhi-110016.

N.N. Mehrotra
8/69, AIIMS
New Delhi-110016.

Kitty Menon
DSE, Delhi University,
Delhi.

Probir Mitra
CSSP, JNU,
New Delhi-110067.

Dinesh Mohan
Centre for Biomedical Engg.
IIT,
New Delhi.

Vishnu Mohan
23, Sutlej Hostel
JNU,
New Delhi.

Suman Mahindra
CSSTD
CSIR,
New Delhi.

Sushil Kumar Mukherjee
232, Jodhpur Park,
Calcutta-700068.

G.V.C. Nadir
40 Purvanchal, JNU,
New Delhi-110067.

K. Nath
204, Jor Bagh,
New Delhi-110003.

S.V. Natraj
V-32, Green Park,
New Delhi-110016.

B.S. Padmanabhan
Spl. Correspondent
"Hindu"

M.P. Parmeswaran
KSSP,
Trivandrum-1.

J. Parthasarthy
6-1-319, Ventaka Puram
Colony.

P. Patnaik
Centre for Economic Studies
& Planning, JNU,
New Delhi-110067.

Meera Poplee
C/o URJA
G-82, S.S. Park,
New Delhi-110013.

Rajendra Prasad
D-12, Geetanjali,
New Delhi-110012.

Ram Prasad
ASWI
10, Rajinder Park,
New Delhi-110060.

Prabir Purkayastha
Blk I, 107, JNU,
New Delhi-110067.

Ms. Ashoklata
Blk I, 107, JNU,
New Delhi-110067.

A. Rehman
Chief, Planning,
CSIR,
New Delhi.

Anil Rai
R-7, Haus Khas,
New Delhi-110016.

P. Rama Murthi
6, Talkatora Rd.
New Delhi.

B. Ramchander Rao
Vice Chairman
UGC,
New Delhi.

A. Ram Reddy
EC-9. Shivalik
IIT,
New Delhi.

Ashok Rao
BHEL,
New Delhi.

J. Manohar Rao
132, Kaveri Hostel
JNU,
New Delhi.

Nina Rao
C-396, Defence Colony,
New Delhi.

N.N. Rao
SIS
JNU,
New Delhi.

C. Raja Mohan
227, Periyar, JNU,
New Delhi-110067.

B. Rajender
49, Poorvanchal, JNU,
New Delhi-110067.

Suborto Ray
Roorkee Univ.,
Dept. of Metallurgy,
Roorkee-247672.

Suranjana Ray
137, Godavari,
JNU,
New Delhi-110067.

Ahmad Raja
HC-22, Kumaon Hostel,
IIT,
New Delhi.

SAH Rizvi
Staff Reporter, Patriot,
New Delhi-110002.

R. Sadananda
School of Computer & System Sciences, JNU,
New Delhi-110067.

Dinkar Sahal
Biochemistry Dept.
AIIMS,
New Delhi-110016.

Dilip Samant Ray
231, Ganga Hostel,
JNU,
New Delhi.

P.V. Pannir Selvam
EA-4, Shivalik Hostel,
IIT,
New Delhi.

Subroto Sengupta
245, Sutlej Hostel,
JNU,
New Delhi-110067.

J.D. Sethi
Member Planning Commission
New Delhi.

Ashok K. Sharma
Physics Dept.
IIT,
New Delhi.

L.K. Sharma
Spl. Correspondent
Times of India,
7, BSZ Marg,
New Delhi-110002.

Vijender Sharma
C2A-15/40 Janak Puri
New Delhi-110058.

Nilabh Shastri
Biochemistry Dept.
AIIMS,
New Delhi-110016.

V. Siddharth
ISRO
Bangalore.

V.S. Sharma
Air Head Qtrs.

Shamsher Singh
Industrial & Engg.
Projects Pvt. Ltd.,
Delhi.

Jagjit Singh
D-943, New Friends Colony,
New Delhi.

R. Subramanium
Instt. of Defence Studies
and Analysis,
New Delhi.

K.C. Suri
JNU.

C.V. Swaminathan
CSIR, Planning Div.
New Delhi.

T.M. Thomas
Desh Bandhu College,
New Delhi.

F.K. Tiwari
ED-18, Vindhyachal Hostel,
IIT,
Delhi.

S. Tripathi
Patel Chest Instt.
Delhi University,
Delhi-110007.

Shiv Vishwanathan
Dept. of Sociology,
DSE,
Delhi University,
Delhi-110007.

P. Vijayan
Lecturer
Ramjas College
Delhi University Campus,
Delhi-110007.

Paul Zykotsky
C4/23, Safdarjang Airport
Area, New Delhi.

COMMUNITY HEALTH CELL
326, V Main, I Block
Koramangala
Bangalore-560034
India

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